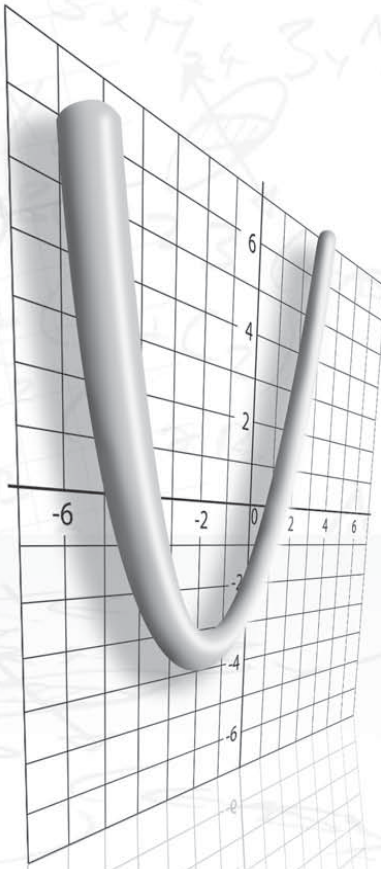
Student Name _____

Teacher Name _____

School _____

System _____



ALGEBRA II

Practice Test

Tennessee End of Course Assessment

Algebra II
Form 2

PEARSON

Developed and published under contract with State of Tennessee Department of Education by the Educational Measurement group of Pearson, a business of NCS Pearson, Inc., 2510 North Dodge Street, Iowa City, Iowa 52245.

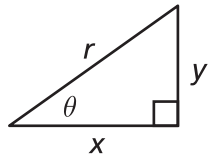
Algebra II Reference Page

Trigonometric Functions

$\sin\theta = \frac{y}{r}$, $\csc\theta = \frac{r}{y}$

$\cos\theta = \frac{x}{r}$, $\sec\theta = \frac{r}{x}$

$\tan\theta = \frac{y}{x}$, $\cot\theta = \frac{x}{y}$



$r = \sqrt{x^2 + y^2}$

Logarithm Properties

$\log_b MN = \log_b M + \log_b N$

$\log_b\left(\frac{M}{N}\right) = \log_b M - \log_b N$

$\log_b M^p = p \log_b M$

$\log_b x = y \Leftrightarrow x = b^y$

Arithmetic and Geometric Sequences and Series

$a_1 = 1^{st}$ term r = common ratio d = common difference

$a_n = n^{th}$ term n = number of terms in series

Arithmetic Sequence: $a_n = a_1 + (n-1)d$ Geometric Sequence: $a_n = a_1 r^{n-1}$

Sum of a Finite Arithmetic Series: $S_n = \frac{n(a_1 + a_n)}{2}$ or $S_n = \frac{1}{2}n[2a_1 + (n-1)d]$

Sum of a Finite Geometric Series: $S_n = \frac{a_1(1-r^n)}{1-r}$, $r \neq 1$

Sum of an Infinite Geometric Series: $S = \frac{a_1}{1-r}$ where $|r| < 1$

Combinations

$${}_nC_r = \frac{n!}{r!(n-r)!}$$

Permutations

$${}_nP_r = \frac{n!}{(n-r)!}$$

Binomial Theorem

$$(a+b)^n = \sum_{r=0}^{n} \binom{n}{r} a^{n-r} b^r$$

Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$y = ax^2 + bx + c$

Interest Formulas

Compound interest: $A = P\left(1 + \frac{r}{n}\right)^{nt}$

Continuous compound interest: $A = Pe^{rt}$

P = present value

A = future value

r = annual interest rate

t = time in years

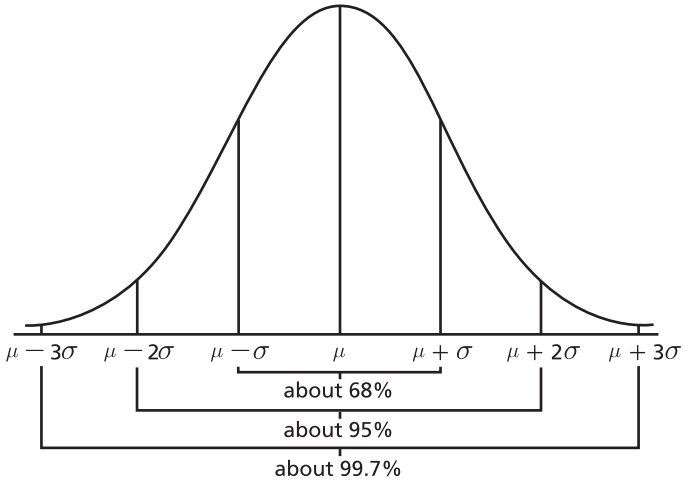
n = frequency of compounding per year

Algebra II Reference Page

Conic Sections – Standard Equations

Parabola	$y = a(x-h)^2 + k$	or	$x = a(y-k)^2 + h$
	$(y-k)^2 = 4p(x-h)$	or	$(x-h)^2 = 4p(y-k)$
Circle	$(x-h)^2 + (y-k)^2 = r^2$		
Ellipse	$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$	or	$\frac{(x-h)^2}{b^2} + \frac{(y-k)^2}{a^2} = 1$
Hyperbola	$\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$	or	$\frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} = 1$

Normal Curve Distribution



Standard Deviation

The standard deviation , σ, for values $x_1, x_2, x_3, \ldots, x_n$ with mean μ is determined by the following:

$$\sigma = \sqrt{\frac{(x_1-\mu)^2 + (x_2-\mu)^2 + \ldots + (x_n-\mu)^2}{n}}$$

Probability Formulas

Exclusive

$$P(A \text{ or } B) = P(A) + P(B)$$

Inclusive

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

Independent

$$P(A \text{ and } B) = P(A) \bullet P(B)$$

Dependent

$$P(A \text{ and } B) = P(A) \bullet P(B|A)$$

Conditional

$$P(B|A) = \frac{P(A \text{ and } B)}{P(A)}$$

Algebra II Reference Page

Cramer's Rule for Solving a System of Linear Equations

For a 2×2 System:

$$a_1x + b_1y = c_1$$
$$a_2x + b_2y = c_2$$

$$x = \frac{\begin{vmatrix} c_1 & b_1 \\ c_2 & b_2 \end{vmatrix}}{\begin{vmatrix} a_1 & b_1 \\ a_2 & b_2 \end{vmatrix}} \qquad y = \frac{\begin{vmatrix} a_1 & c_1 \\ a_2 & c_2 \end{vmatrix}}{\begin{vmatrix} a_1 & b_1 \\ a_2 & b_2 \end{vmatrix}}$$

For a 3×3 System:

$$a_1x + b_1y + c_1z = d_1$$
$$a_2x + b_2y + c_2z = d_2$$
$$a_3x + b_3y + c_3z = d_3$$

$$x = \frac{\begin{vmatrix} d_1 & b_1 & c_1 \\ d_2 & b_2 & c_2 \\ d_3 & b_3 & c_3 \end{vmatrix}}{\begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}} \qquad y = \frac{\begin{vmatrix} a_1 & d_1 & c_1 \\ a_2 & d_2 & c_2 \\ a_3 & d_3 & c_3 \end{vmatrix}}{\begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}} \qquad z = \frac{\begin{vmatrix} a_1 & b_1 & d_1 \\ a_2 & b_2 & d_2 \\ a_3 & b_3 & d_3 \end{vmatrix}}{\begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}}$$

Converting Degrees to Radians

Multiply degree measure by $\frac{\pi}{180^\circ}$

Converting Radians to Degrees

Multiply radian measure by $\frac{180^\circ}{\pi}$

Definition of "i"

$$i^2 = -1$$
$$i = \sqrt{-1}$$

Absolute Value of a Complex Number

$$|a + bi| = \sqrt{a^2 + b^2}$$

Contents

Introduction to Algebra II

Content of tests

The testing program titled the *Tennessee End of Course Assessment* was established to meet the Tennessee mandate for end of course assessments in Tennessee secondary schools. These tests measure the Tennessee State Performance Indicators. Subject areas covered by the end of course assessments include Mathematics, Language Arts, History, and Science.

Test development

For the *Tennessee End of Course Assessment,* professional item writers experienced in each of the content areas researched and wrote the items. Professional editors and test developers carefully reviewed all items and test directions for content and accuracy. To provide a large pool of items for final test selection, the test developers created approximately 50% more items as were needed in the final editions of the tests.

After items were field tested, student responses were analyzed. Professional content editors and researchers carefully reviewed items, their data, and test directions for content, suitability, and accuracy before including certain items and test directions in operational tests.

Test administration

Tennessee End of Course Assessments are given to students as they are completing courses that are included in the program. Tests may be given midyear for block schedules or at the end of the school year.

This test contains 65 multiple-choice questions.

You will have ample time to read each of the questions. The Algebra II test has been designed to be administered in one session and is not timed. The first 15 minutes are set aside to complete identifying data on the answer sheet.

A reference page, similar to the one located in this Practice Test, will be in the front of the actual test. This page includes a list of formulas, equations, and tables for use during testing.

Calculator use is recommended. Sharing calculators during testing is not permitted.

The following types of calculators/devices may **NOT** be used during the test:

- pocket organizers
- electronic writing pads or input devices
- Some examples of prohibited calculators are:
    - Casio models: CFX-9970G, Algebra FX 2.0
    - Hewlett-Packard models: HP-40G, HP-49G
    - Texas Instruments models: TI-89, TI-92, Voyage 200, TI-NSPIRE – the CAS version (The non-CAS version of TI-NSPIRE is allowable.)
- calculators that can communicate (transfer data or information) wirelessly with other student calculators/devices
- cell phones, PSPs, and/or iPods
- Students may use any four-function, scientific, or graphing calculator does not have any of the above features. The use of units that have a Computer Algebra System (CAS) is NOT allowed.

Tips for Taking the Test

Preparing for the test

- Take this Practice Test several times
- Review the Tennessee End of Course Item Sampler for Algebra II located at http://tennessee.gov/education/assessment/sec_samplers.shtml on the Tennessee Department of Education Web site.
- Become familiar with the correct way to mark answers on the answer sheet. There is a sample answer sheet in this Practice Test.

Before the test

- Get a good night's sleep. To do your best, you need to be rested.

During the test

- Relax. It is normal to be somewhat nervous before the test. Try to relax and not worry.
- Listen. Listen to and read the test directions carefully. Ask for an explanation of the directions if you do not understand them.
- Plan your time. Do not spend too much time on any one question. If a question seems to take too long, skip it and return to it later. First answer all questions that you are sure about.
- Think. If you are not sure how to answer a question, read it again and try your best to answer the question. Rule out answer choices that you know are incorrect and choose from those that remain.

Answer Sheet for the Practice Test

1 Ⓐ Ⓑ Ⓒ Ⓓ	14 Ⓐ Ⓑ Ⓒ Ⓓ	27 Ⓐ Ⓑ Ⓒ Ⓓ	40 Ⓐ Ⓑ Ⓒ Ⓓ	53 Ⓐ Ⓑ Ⓒ Ⓓ
2 Ⓐ Ⓑ Ⓒ Ⓓ	15 Ⓐ Ⓑ Ⓒ Ⓓ	28 Ⓐ Ⓑ Ⓒ Ⓓ	41 Ⓐ Ⓑ Ⓒ Ⓓ	54 Ⓐ Ⓑ Ⓒ Ⓓ
3 Ⓐ Ⓑ Ⓒ Ⓓ	16 Ⓐ Ⓑ Ⓒ Ⓓ	29 Ⓐ Ⓑ Ⓒ Ⓓ	42 Ⓐ Ⓑ Ⓒ Ⓓ	55 Ⓐ Ⓑ Ⓒ Ⓓ
4 Ⓐ Ⓑ Ⓒ Ⓓ	17 Ⓐ Ⓑ Ⓒ Ⓓ	30 Ⓐ Ⓑ Ⓒ Ⓓ	43 Ⓐ Ⓑ Ⓒ Ⓓ	56 Ⓐ Ⓑ Ⓒ Ⓓ
5 Ⓐ Ⓑ Ⓒ Ⓓ	18 Ⓐ Ⓑ Ⓒ Ⓓ	31 Ⓐ Ⓑ Ⓒ Ⓓ	44 Ⓐ Ⓑ Ⓒ Ⓓ	57 Ⓐ Ⓑ Ⓒ Ⓓ
6 Ⓐ Ⓑ Ⓒ Ⓓ	19 Ⓐ Ⓑ Ⓒ Ⓓ	32 Ⓐ Ⓑ Ⓒ Ⓓ	45 Ⓐ Ⓑ Ⓒ Ⓓ	58 Ⓐ Ⓑ Ⓒ Ⓓ
7 Ⓐ Ⓑ Ⓒ Ⓓ	20 Ⓐ Ⓑ Ⓒ Ⓓ	33 Ⓐ Ⓑ Ⓒ Ⓓ	46 Ⓐ Ⓑ Ⓒ Ⓓ	59 Ⓐ Ⓑ Ⓒ Ⓓ
8 Ⓐ Ⓑ Ⓒ Ⓓ	21 Ⓐ Ⓑ Ⓒ Ⓓ	34 Ⓐ Ⓑ Ⓒ Ⓓ	47 Ⓐ Ⓑ Ⓒ Ⓓ	60 Ⓐ Ⓑ Ⓒ Ⓓ
9 Ⓐ Ⓑ Ⓒ Ⓓ	22 Ⓐ Ⓑ Ⓒ Ⓓ	35 Ⓐ Ⓑ Ⓒ Ⓓ	48 Ⓐ Ⓑ Ⓒ Ⓓ	61 Ⓐ Ⓑ Ⓒ Ⓓ
10 Ⓐ Ⓑ Ⓒ Ⓓ	23 Ⓐ Ⓑ Ⓒ Ⓓ	36 Ⓐ Ⓑ Ⓒ Ⓓ	49 Ⓐ Ⓑ Ⓒ Ⓓ	62 Ⓐ Ⓑ Ⓒ Ⓓ
11 Ⓐ Ⓑ Ⓒ Ⓓ	24 Ⓐ Ⓑ Ⓒ Ⓓ	37 Ⓐ Ⓑ Ⓒ Ⓓ	50 Ⓐ Ⓑ Ⓒ Ⓓ	63 Ⓐ Ⓑ Ⓒ Ⓓ
12 Ⓐ Ⓑ Ⓒ Ⓓ	25 Ⓐ Ⓑ Ⓒ Ⓓ	38 Ⓐ Ⓑ Ⓒ Ⓓ	51 Ⓐ Ⓑ Ⓒ Ⓓ	64 Ⓐ Ⓑ Ⓒ Ⓓ
13 Ⓐ Ⓑ Ⓒ Ⓓ	26 Ⓐ Ⓑ Ⓒ Ⓓ	39 Ⓐ Ⓑ Ⓒ Ⓓ	52 Ⓐ Ⓑ Ⓒ Ⓓ	65 Ⓐ Ⓑ Ⓒ Ⓓ

Directions for Taking the Practice Test

In this Practice Test, you will answer various mathematical operations. You may use your calculator and Reference Page located in the front of this book to help you solve the problems. You may write in the open spaces in this book to work the problems, but remember to fill in the circle on your answer sheet that goes with the answer you choose for each question. Fill in the circle completely and make your mark heavy and dark. If you want to change an answer, erase the mark you made and make a new mark.

You will do the items in this Practice Test by yourself. Remember to read all the directions carefully. When you have finished, you may check for answers.

On your answer sheet, find Number 1. Mark your answers beginning with Number 1.

You may begin.

Stop when you have finished the test.

At the end of the Practice Test, make sure that all your marks are heavy and dark and that you have completely erased any marks that you do not want.

Turn to 77 and locate the Answer Key. Check your answers and review those items that you marked incorrectly.

1. Which set is the solution set for $3x^2 - 78 = 114$?

A $\{\pm 2\sqrt{3}\}$

B $\{\pm 6\}$

C $\{\pm 8\}$

D $\{\pm 8\sqrt{3}\}$

2. **The table below shows the fuel remaining in Alex's car at different times on his trip to New York City.**

Fuel Remaining in Alex's Car

Time (in hours)	Fuel Remaining (in liters)
0.00	50.0
0.25	47.6
0.50	46.2
0.75	43.8
1.00	41.6

Using the line of best fit, which is the best estimation of the fuel remaining after 3.5 hours if Alex continues to drive at the same mean speed?

A 16.4 liters

B 19.6 liters

C 20.6 liters

D 21.1 liters

3. What is the sum of $(-5r^3 + 2r^2 - r + 14)$ and $(8r^3 - 19)$?

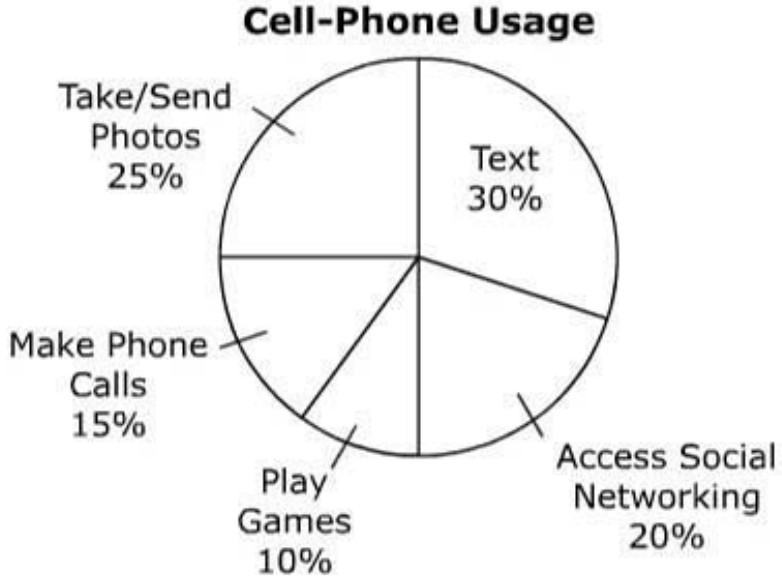
A $3r^3 + 2r^2 - r - 5$

B $3r^3 - 17r^2 - r + 14$

C $-3r^3 + 2r^2 - r + 5$

D $-3r^3 + 17r^2 - r + 14$

4. **The manager of a cell-phone company conducted a survey of 50 teenagers to determine their primary type of cell-phone usage. Among those surveyed, 15 teenagers said texting, 10 teenagers said social networking, 5 teenagers said games, 8 teenagers said phone calls, and 12 teenagers said photos. The manager made the graph below to represent the survey data.**



Which statement is true regarding the graph?

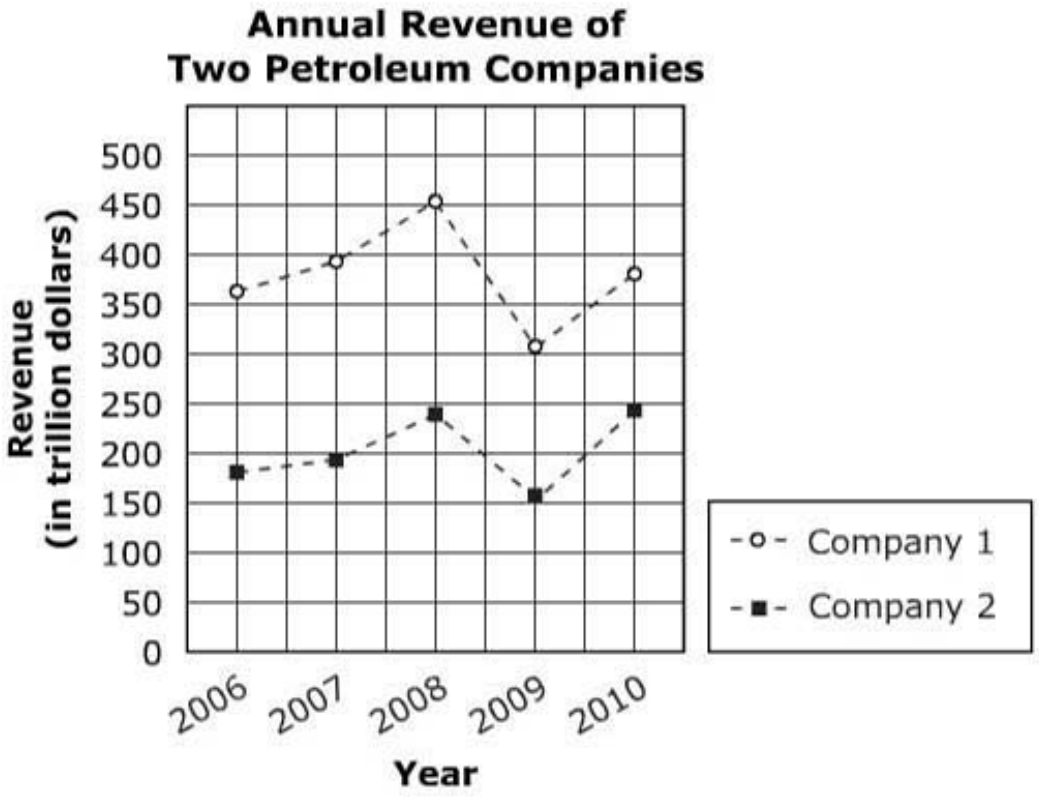
A The graph is accurate because the number of respondents represents the correct percentage of the total respondents of the survey.

B The graph is misleading because the data represented in the circle graph does not represent the correct percentage.

C The graph is accurate because the percentages shown in the graph add up to 100%.

D The graph is misleading because a circle graph is not the best way to represent such data.

5. **The graph shows the annual revenue of two petroleum companies from 2006 to 2010.**



Which statement is <u>best</u> supported by the data in the graph?

A In 2008, the revenue of Company 2 was half of the revenue of Company 1.

B In 2010, the revenue of Company 1 was twice the revenue of Company 2.

C The total revenue of Company 1 was less than the total revenue of Company 2 from 2006 to 2010.

D The mean annual revenue of Company 2 was less than the mean annual revenue of Company 1 from 2006 to 2010.

6. **The data below show the time, in seconds, that fifteen students in a swimming class can hold their breath underwater.**

38, 48, 37, 54, 29, 37, 28, 47, 45, 50, 41, 34, 40, 60, 58

What is the interquartile range for this data?

A 4 seconds

B 9 seconds

C 13 seconds

D 32 seconds

7. **A battery manufacturer randomly selects one battery each from two different batches of batteries produced in a factory for testing. The table below shows the number of nondefective and defective batteries in the two batches of batteries.**

Number of Nondefective and Defective Batteries

	Nondefective	Defective
Batch 1	96	4
Batch 2	98	2

What is the probability that the battery manufacturer picks a defective battery first from batch 1 and then from batch 2?

A 0.0008

B 0.0192

C 0.0392

D 0.9408

8. Simplify the expression $\left(\frac{x^{\frac{1}{4}}y^{-\frac{1}{2}}}{4x^{\frac{2}{3}}}\right)\left(\frac{32}{y^{\frac{7}{2}}}\right)$ for all $x, y \neq 0$.

A $8x^{\frac{11}{12}}y^{3}$

B $\frac{8y^{3}}{x^{\frac{5}{12}}}$

C $\frac{8x^{\frac{11}{12}}}{y^{4}}$

D $\frac{8}{x^{\frac{5}{12}}y^{4}}$

9. What is the value of $\csc\left(-\frac{19\pi}{3}\right)$?

A -2

B $-\frac{2\sqrt{3}}{3}$

C $\frac{2\sqrt{3}}{3}$

D 2

10. **Kristen builds a pathway of uniform width, x, in feet, around her rectangular flower garden. The garden is 22 feet long and 18 feet wide. What is the area, A, in square feet, of the garden including the pathway?**

A $A = 36x + 396$

B $A = 44x + 396$

C $A = x^2 + 40x + 396$

D $A = 4x^2 + 80x + 396$

11. **The mean of a normal distribution is 70 with a standard deviation of 5. If a value is randomly selected from this distribution, which is closest to the probability that the selected value is greater than or equal to 75?**

A 0.16

B 0.34

C 0.66

D 0.84

12. What is the domain of $f(x) = -\sqrt{-2x + 3}$?

A $x \leq \frac{3}{2}$

B $x \leq -\frac{3}{2}$

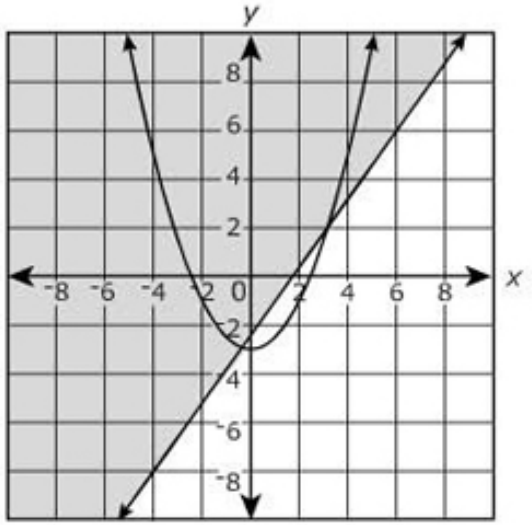
C $x \geq \frac{3}{2}$

D $x \geq -\frac{3}{2}$

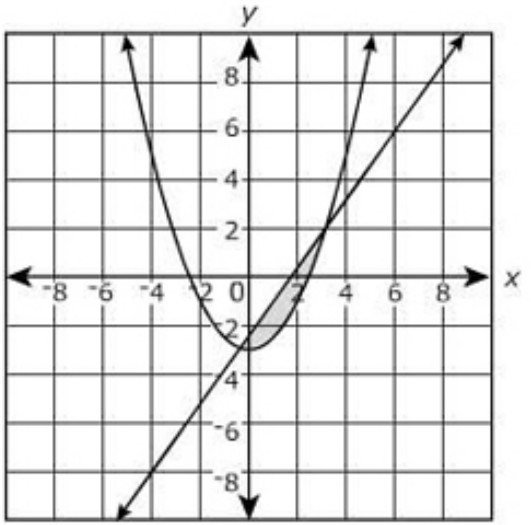
13. Which graph best represents the system of inequalities below?

$$7x - 5y \leq 12$$
$$x^2 - 2y \leq 6$$

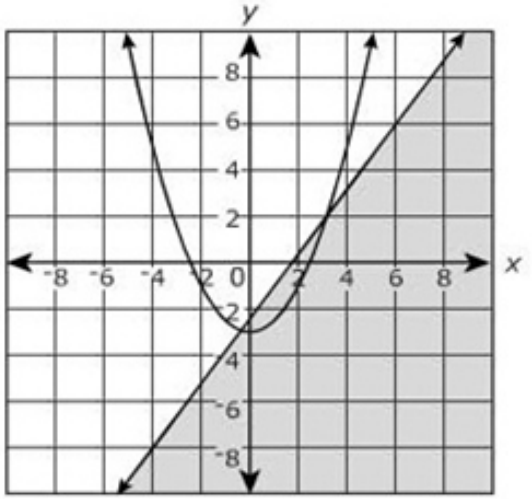
A



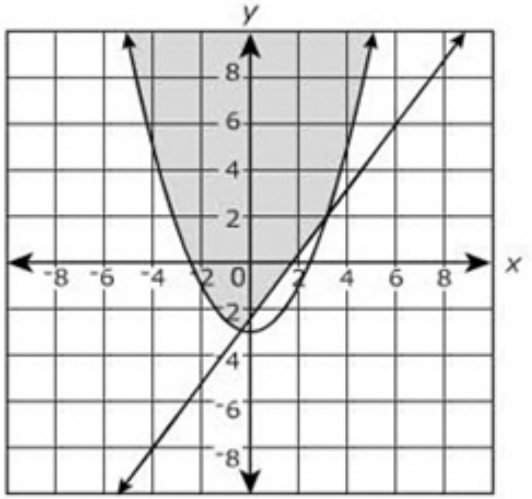
C



B



D



14. **Which number must be subtracted from $-9 + 17i$ to get $-11 + 14i$?**

A $-2 - 3i$

B $-2 + 31i$

C $2 + 3i$

D $2 + 31i$

15. **The average time, in minutes, spent by nine students talking on the phone each day is given below.**

14, 5, 10, 12, 16, 9, 8, 12, 4

Which is closest to the value of the standard deviation of the given data?

A 1.2 minutes

B 3.7 minutes

C 10 minutes

D 14 minutes

16. John finds the roots of the equation $|2x + 9| = 13$ using the following steps.

Step 1: $2x + 9 = 13$ or $2x - 9 = 13$
Step 2: $2x + 9 - 9 = 13 - 9$ or $2x - 9 + 9 = 13 + 9$
Step 3: $2x = 4$ or $2x = 22$
Step 4: $x = 2$ or $x = 11$

Which step is the first incorrect step?

A Step 1

B Step 2

C Step 3

D Step 4

17. **Which expression is equivalent to $(12r + 3s)(8r - 5s)$?**

A $96r^2 + 76rs + 15s^2$

B $96r^2 + 84rs + 15s^2$

C $96r^2 - 4rs - 15s^2$

D $96r^2 - 36rs - 15s^2$

18. The table below shows the voting-age population for several years after 1995.

Voting-Age Population

Number of Years after 1995, x	1	3	5	7	9	11	13
Population, y (in millions)	193.7	198.2	202.6	210.4	215.7	220.6	225.5

Assuming an exponential growth, which equation best represents the data?

A $y = 1.013(190.925)^x$

B $y = 192.674(1.010)^x$

C $y = 190.925(1.013)^x$

D $y = 1.010(192.674)^x$

19. If $f(x) = \frac{x^2-3}{4}$ and $g(x) = 4x - 1$, which expression represents $f(g(x))$?

A $x^2 - 4$

B $\frac{8x^2-4x-1}{2}$

C $\frac{16x^2-8x+1}{4}$

D $\frac{8x^2-1}{2}$

20. **Which pair of functions are inverses of each other?**

A $f(x) = \frac{3}{x-4}$ and $g(x) = \frac{x-4}{3}$

B $f(x) = 2x^2 + 8x$ and $g(x) = 2x^2 - 8x$

C $f(x) = \sqrt{x+12}$ and $g(x) = x^2 - 12$

D $f(x) = 3^x$ and $g(x) = x^3$

21. **The table below shows a plant nutrient (in nutrient tons) used by cotton farmers from 2001 to 2009.**

Amount of Plant Nutrient Used by Cotton Farmers

Year	Plant Nutrient (in nutrient tons)
2001	569
2002	508
2003	508
2004	502
2005	517
2006	559
2007	441
2008	421
2009	345

Which best describes the linear correlation of the plant nutrient from 2001 to 2009?

A Weak positive correlation

B Weak negative correlation

C Strong positive correlation

D Strong negative correlation

22. **Which equation best represents the relationship between the *x* and *y* values in the table below?**

x	*y*
1	4
2	20
3	100
4	500

A $y = 0.8(0.2)^{x}$

B $y = 0.8(0.2)^{-x}$

C $y = 8(0.2)^{-x}$

D $y = 8(0.2)^{x}$

23. **What is the complex conjugate of $19 + \sqrt{-169}$?**

A $-19 - 13i$

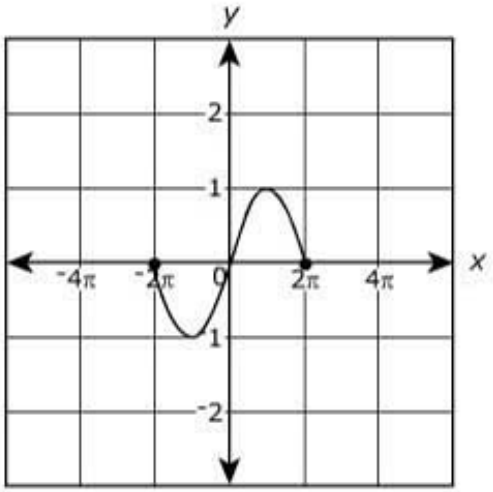
B $-19 + 13i$

C $19 + 13i$

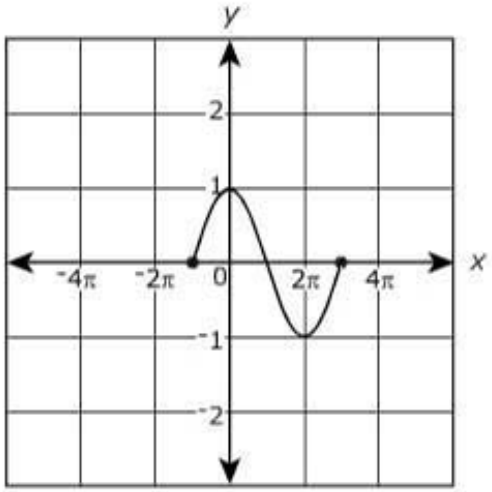
D $19 - 13i$

24. Which graph best represents one cycle of $f(x) = \cos\left(\frac{x}{2}\right)$?

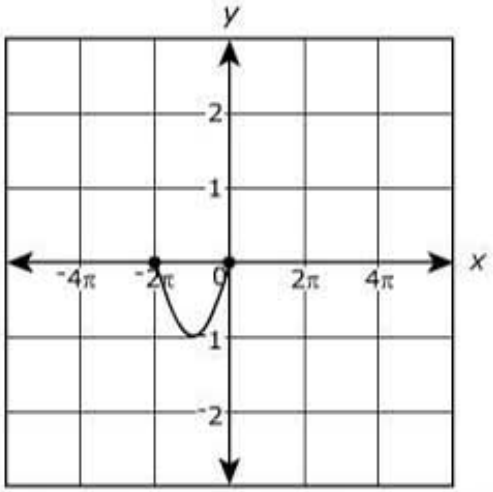
A



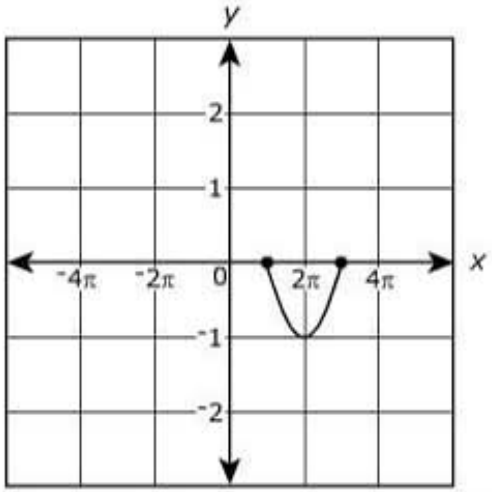
C



B



D



25. Which expression represents the quotient of $\frac{-15p^6q^4 - 45p^9q^6 + 20p^3q^8}{5p^3q^2}$ for all $p \neq 0$ and $q \neq 0$?

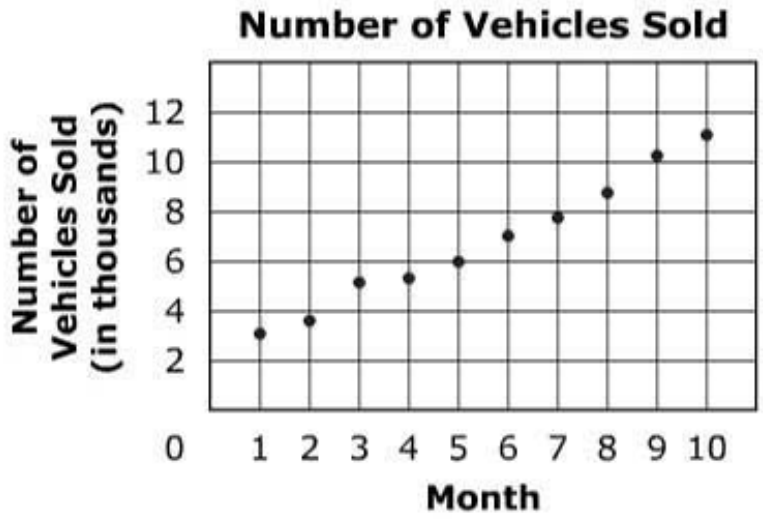
A $-3p^2q^2 - 9p^3q^3 + 4pq^4$

B $-3p^3q^2 - 9p^6q^4 + 4q^6$

C $-3p^3q^4 - 9p^6q^6 + 4q^8$

D $-3p^9q^6 - 9p^{12}q^8 + 4p^6q^{10}$

26. **The scatterplot below shows the number of vehicles sold by an automobile company over a ten-month period.**



Which type of function do the data points best represent?

A linear

B quadratic

C exponential

D logarithmic

27. **The following data, in kilograms, give the amounts of potatoes grown using two different types of fertilizers.**

Fertilizer A: 25, 29, 19, 15, 18, 23
Fertilizer B: 27, 28, 18, 20, 19, 26

Which statement about the two sets of data is true?

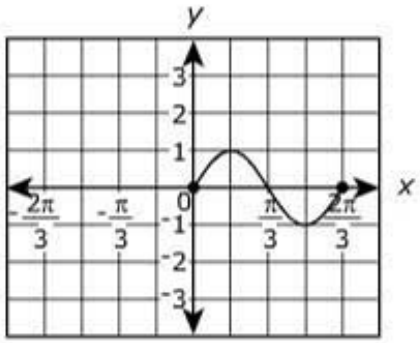
A The mean of the data for fertilizer A is greater than the mean of the data for fertilizer B.

B The median of the data for fertilizer A is greater than the median of the data for fertilizer B.

C The standard deviation for the data for fertilizer A is greater than the standard deviation for the data for fertilizer B.

D The interquartile range in the data for fertilizer A is greater than the interquartile range in the data for fertilizer B.

28. One cycle of a trigonometric function is graphed below.



Which function is <u>best</u> represented by this graph?

A $f(x) = \sin(3x)$

B $f(x) = \cos(3x)$

C $f(x) = 3\sin x$

D $f(x) = 3\cos x$

29. **The half-life of cobalt-60 is 5.27 years. The mass of a sample, y, in mg, present at time, t, in years, is represented by the equation $y = a \cdot 2^{-\frac{t}{5.27}}$. If the initial amount, a, of a sample is 60 mg, after how many years will the amount left be 3.75 mg?**

A 9.27 years

B 15.81 years

C 21.08 years

D 26.35 years

30. What is the coefficient of the eighth term in the expansion of $(5x^2 - y)^9$?

A −900

B −36

C 36

D 900

31. What is the solution set for the equation $6x^2 + 7x - 10 = 0$?

A $\left\{-2, -\frac{5}{6}\right\}$

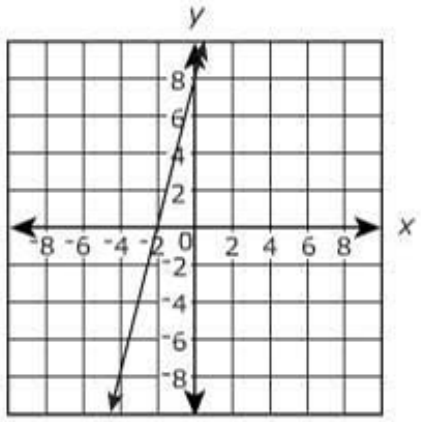
B $\left\{-2, \frac{5}{6}\right\}$

C $\left\{2, -\frac{5}{6}\right\}$

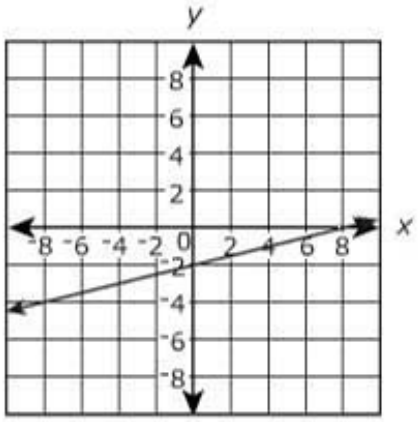
D $\left\{2, \frac{5}{6}\right\}$

32. Which graph represents the inverse of $f(x) = -4x - 8$?

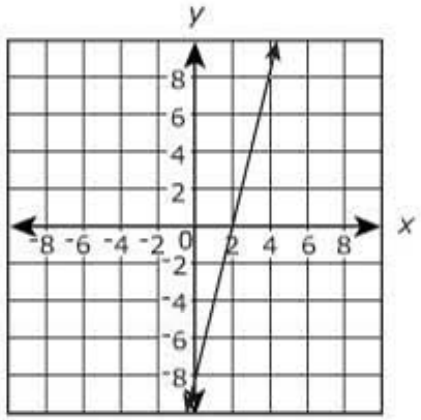
A



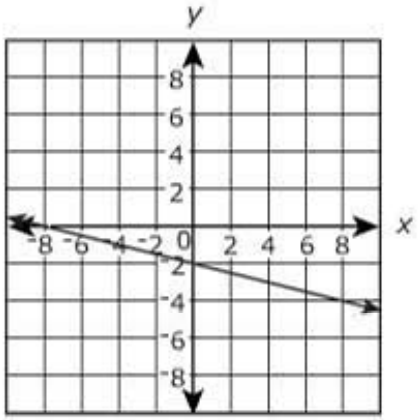
C



B



D



33. **Mike and Lynn entered a jump rope contest. The table below shows the number of consecutive jumps in five attempts.**

Number of Consecutive Jumps

	Mike	Lynn
Attempt 1	45	35
Attempt 2	28	52
Attempt 3	26	29
Attempt 4	54	39
Attempt 5	42	50

Which statement best compares Mike's data to Lynn's data?

A Mike's data has a lesser mean and a lesser standard deviation than Lynn's data.

B Mike's data has a lesser mean but a greater standard deviation than Lynn's data.

C Mike's data has a greater mean but a lesser standard deviation than Lynn's data.

D Mike's data has a greater mean and a greater standard deviation than Lynn's data.

34. What are all the roots of $x^3 - 3x^2 - 4x + 12 = 0$?

A 2 and 3

B 2 and −2

C 2, −2, and 3

D 2, 3, and −3

35. Which expression is equivalent to $\frac{x^2-x-6}{x^2+x-12} + \frac{x^2-5x-24}{x^2-4x-32}$?

A $\frac{2x+1}{x+4}$

B $\frac{2x-1}{x+4}$

C $\frac{2x-5}{x+4}$

D $\frac{2x+5}{x+4}$

36. **The table below shows the foraging performance of honeybees.**

Foraging Performance of Honeybees

Foraging Experience (days)	Mean Rate of Food Delivery (mg/min)
2	0.3
4	0.55
6	0.6
8	0.6
10	0.55
12	0.6

If the data is modeled by a quadratic equation, which rate is closest to the mean food delivery rate in milligrams per minute (mg/min) on Day 7?

A 0.15 mg/min

B 0.45 mg/min

C 0.53 mg/min

D 0.61 mg/min

37. **What is the sum of the infinite geometric series below?**

$$6 + 1.2 + 0.24 + \ldots$$

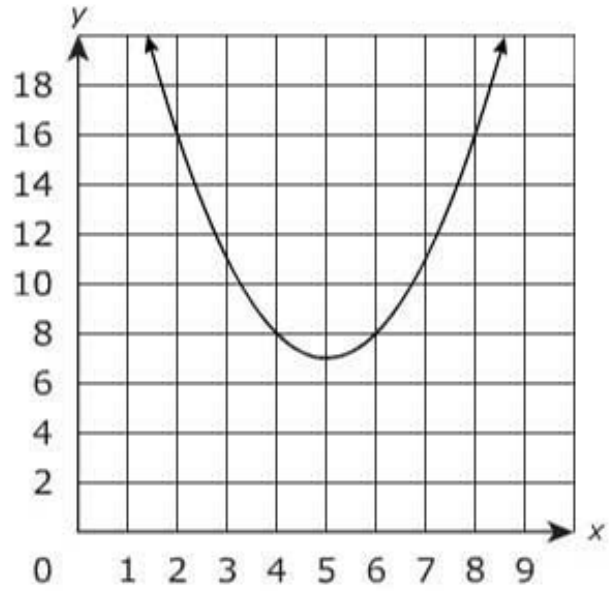
A 7.5

B 7.2

C 5.0

D 4.8

38. **Which equation <u>best</u> represents the graph below?**



A $y = (x - 5)^2 + 7$

B $y = (x + 5)^2 + 7$

C $y = (x - 5)^2 - 7$

D $y = (x + 5)^2 - 7$

39. **Jack earned a score of 74 on an aptitude test whose scores are normally distributed. The mean test score is 62 with a standard deviation of 6. If a student is randomly selected, which is closest to the probability that the student's score is greater than or equal to Jack's score?**

A 0.975

B 0.525

C 0.475

D 0.025

40. Which expression is equivalent to $\left(\frac{9x^{\frac{2}{5}}y^{\frac{1}{2}}}{121x^{\frac{4}{5}}y^{2}}\right)^{\frac{1}{2}}$ for all $x, y \neq 0$?

A $\frac{3x^{\frac{3}{5}}y^{\frac{5}{4}}}{11}$

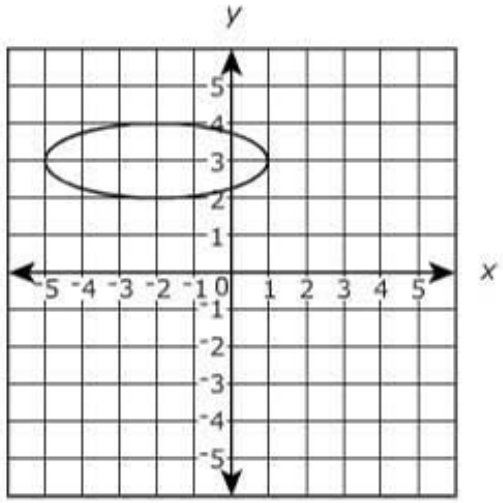
B $\frac{3}{11x^{\frac{1}{5}}y^{\frac{3}{4}}}$

C $\frac{3}{121x^{\frac{3}{5}}y^{\frac{7}{4}}}$

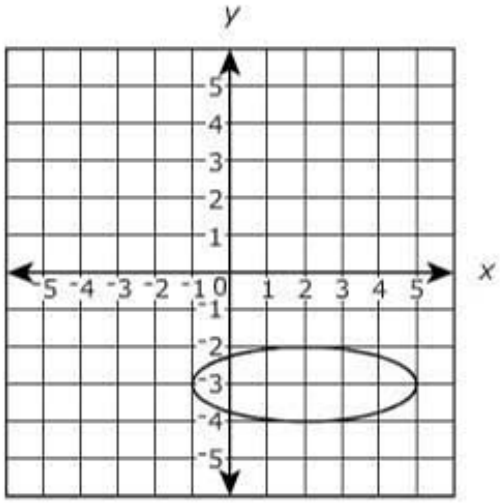
D $\frac{9}{121x^{\frac{1}{5}}y^{\frac{3}{4}}}$

41. Which graph best represents the equation $\frac{(x-2)^2}{9} + \frac{(y-3)^2}{1} = 1$?

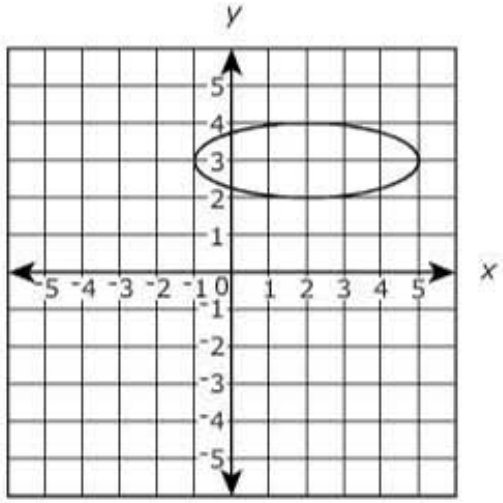
A



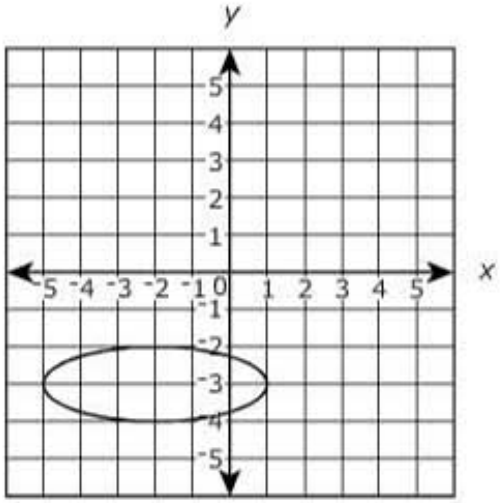
C



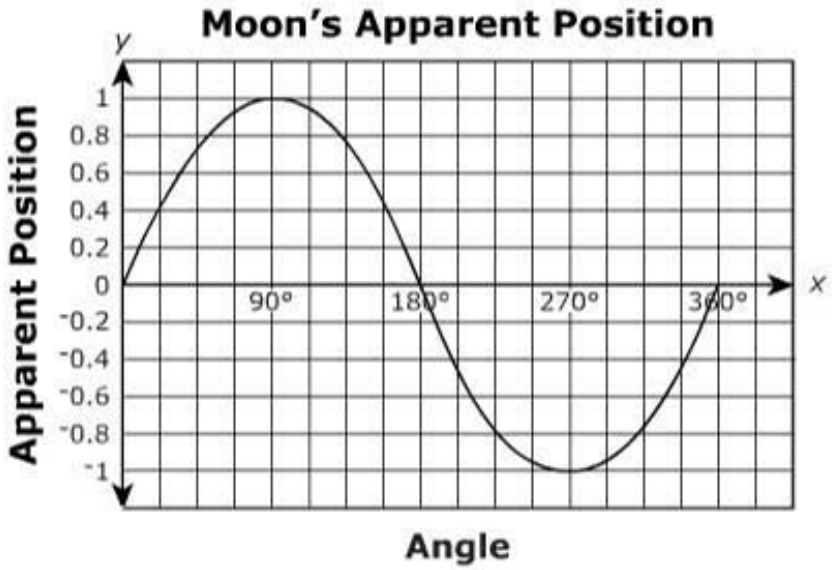
B



D



42. **The apparent position of a moon varies sinusoidally with the changing angle from a line of sight as it orbits Jupiter. The moon's apparent position is shown in the graph below.**



Which are the <u>closest</u> amplitude and period of the moon's orbit?

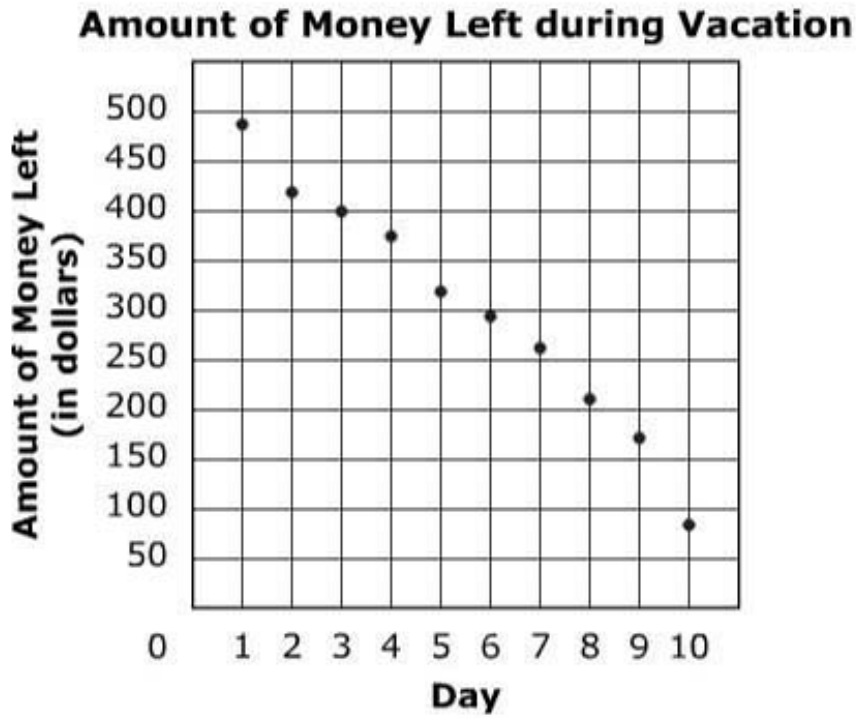
A Amplitude = 0.5 and Period = 180°

B Amplitude = 0.5 and Period = 360°

C Amplitude = 1 and Period = 180°

D Amplitude = 1 and Period = 360°

43. **Samantha recorded the amount of money she had left at the end of each day of her vacation.**



Which type of function do the data points <u>best</u> represent?

A linear

B quadratic

C exponential

D logarithmic

44. What is the 10th term of the sequence below?

$$\sqrt{3},\ 3,\ 3\sqrt{3},\ \ldots$$

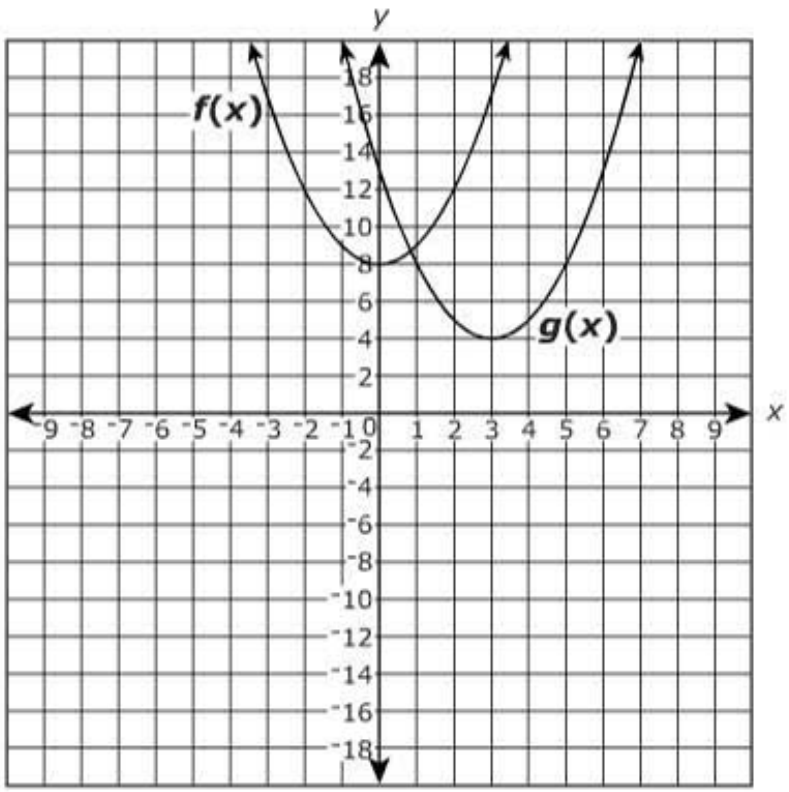
A $\frac{1}{243}$

B $\frac{1}{81}$

C 243

D 729

45. On the grid below, the graph of the equation $f(x) = x^2 + 8$ is transformed to create $g(x)$.



Which equation <u>best</u> represents the transformed graph?

A $g(x) = f(x + 3) - 4$

B $g(x) = f(x + 3) + 4$

C $g(x) = f(x - 3) - 4$

D $g(x) = f(x - 3) + 4$

46. What is the standard form of $\frac{-5i}{4+3i}$?

A $\frac{15}{7} - \frac{20}{7}i$

B $-\frac{3}{5} - \frac{4}{5}i$

C $-\frac{23}{25}i$

D $-\frac{23}{7}i$

47. **What is the solution to the system of equations?**

$$\begin{bmatrix} -3 & 0 & 12 \\ 2 & 1 & -4 \\ 1 & 2 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -6 \\ -12 \\ -16 \end{bmatrix}$$

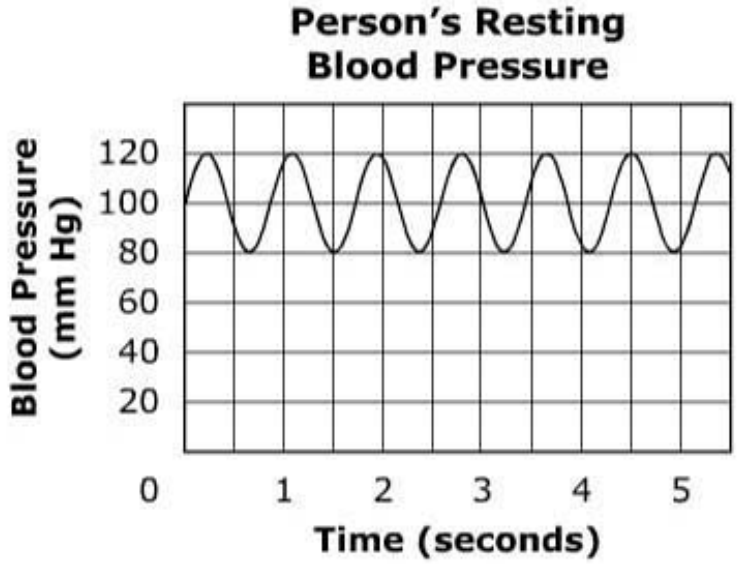
A $\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 70 \\ -60 \\ 17 \end{bmatrix}$

B $\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -6 \\ -4 \\ -1 \end{bmatrix}$

C $\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 6 \\ 4 \\ 1 \end{bmatrix}$

D $\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -26 \\ 12 \\ -7 \end{bmatrix}$

48. **A person's resting blood pressure, in millimeters of mercury (mm Hg), as a function of time, in seconds, is modeled by the graph below.**



A function describing this graph is a transformation of the parent sine function, $y = \sin x$. Which value best describes the amplitude for this transformed function?

A 20 mm Hg

B 40 mm Hg

C 100 mm Hg

D 120 mm Hg

49. Which value of x makes this equation true?

$$(x - 16)^{\frac{4}{3}} = 81$$

- **A** 43
- **B** 27
- **C** 25
- **D** 19

50. The table below shows the prices for a particular brand of television.

Television Prices

Size (inches)	Price (dollars)
19	233
22	280
32	296
37	550
40	620
46	940

If the data are modeled by a quadratic function, which is closest to the price of a 20-inch television?

A $186

B $234

C $248

D $310

51. **What is the range of the function $y = \sqrt{9 - x^2}$?**

A all real numbers greater than or equal to −3 and less than or equal to 3

B all real numbers greater than or equal to 0 and less than or equal to 3

C all real numbers greater than or equal to −9 and less than or equal to 9

D all real numbers greater than or equal to 0 and less than or equal to 9

52. **The number of bacteria in a sample can be modeled by the equation $A = 256e^{1.386t}$, where t is in hours. In approximately how many hours will there be 16,384 bacteria?**

A 1 hour

B 2 hours

C 3 hours

D 4 hours

53. If $h(x) = |3x - 2|$ and $g(x) = 1 - \frac{x^2}{2}$, what is the value of $h\left(g\left(-\frac{3}{2}\right)\right)$?

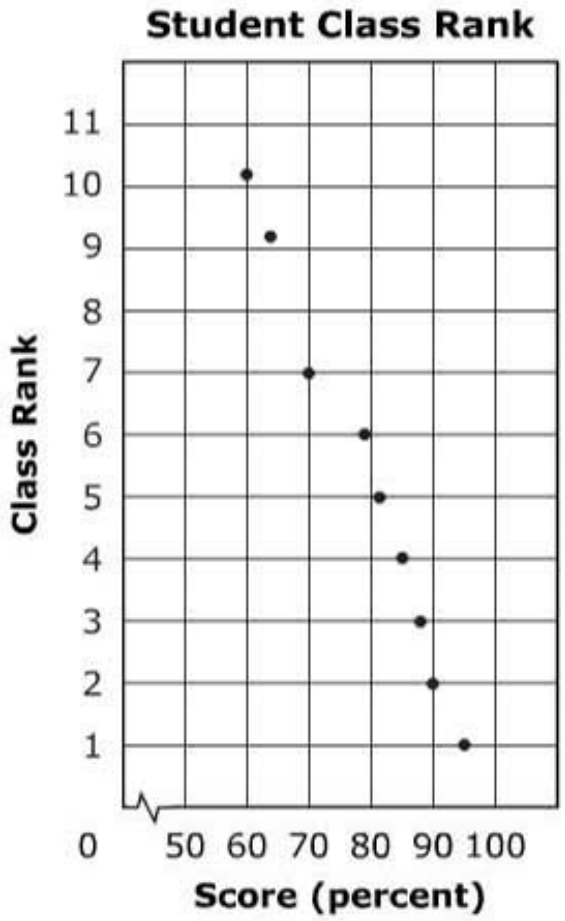
A $\frac{13}{2}$

B $\frac{19}{8}$

C $-\frac{1}{8}$

D $-\frac{13}{16}$

54. **The graph below shows the relationship between the percent scores of students in a certain class and their class rank.**



Which value is the best estimate for the correlation coefficient?

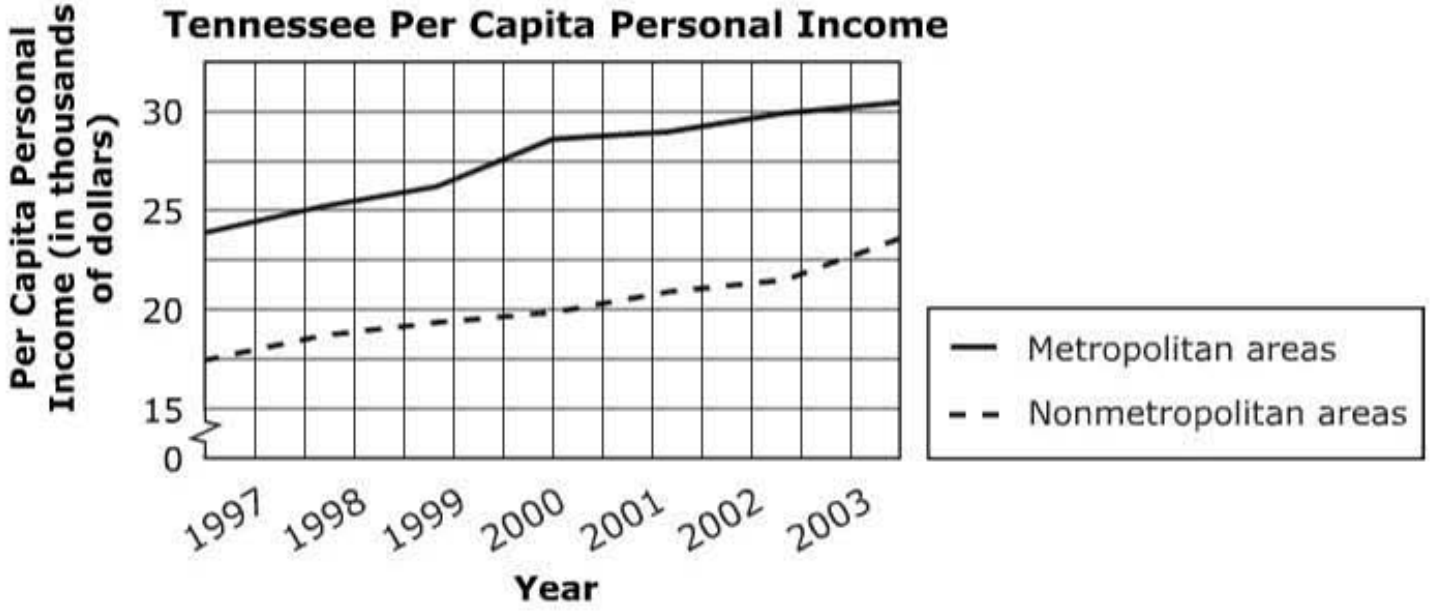
A 0.99

B 1

C −1

D −0.99

55. **The graph shows the per capita personal income of Tennessee's metropolitan and nonmetropolitan areas.**



Which statement about the data shown is true?

A The nonmetropolitan areas have a greater annual mean of per capita personal income than the metropolitan areas.

B The nonmetropolitan areas have a greater range of per capita personal income than the metropolitan areas.

C The percent of increase of the sum of per capita personal income of the metropolitan and nonmetropolitan areas from 1997 to 2003 is about 29%.

D The percent of increase of the difference between the per capita personal income of the metropolitan and nonmetropolitan areas from 1997 to 2003 is about 53%.

56. **Susan and Lisa each have two different part-time jobs. Both girls are paid the same amount per hour for yard work and the same amount per hour for tutoring. The table below shows the number of hours they each work and the total amount they earn.**

Amount Earned for Part-Time Jobs

	Yard Work (in hours)	Tutoring (in hours)	Amount
Susan	6	5	$120
Lisa	4	6	$112

How much do Susan and Lisa earn per hour for yard work?

A $10

B $12

C $21

D $23

57. Ron, a juggler, randomly picks one ball each from three different bags. The table below shows the number of blue, red, and green balls in the three bags.

Number of Blue, Red, and Green Balls

	Blue	Red	Green
Bag 1	6	4	2
Bag 2	4	5	4
Bag 3	2	6	6

What is the probability that Ron picks a red ball from bag 1, a blue ball from bag 2, and a green ball from bag 3?

A $\frac{2}{91}$

B $\frac{4}{91}$

C $\frac{5}{91}$

D $\frac{6}{91}$

58. Which degree measure is equivalent to $\frac{11\pi}{18}$?

A 220°

B 110°

C 55°

D 10°

59. **A local community college conducts a survey to determine the percent of high school seniors in the community who want to attend the college in the fall term following their graduation. Which of these samples will provide the <u>most</u> accurate results?**

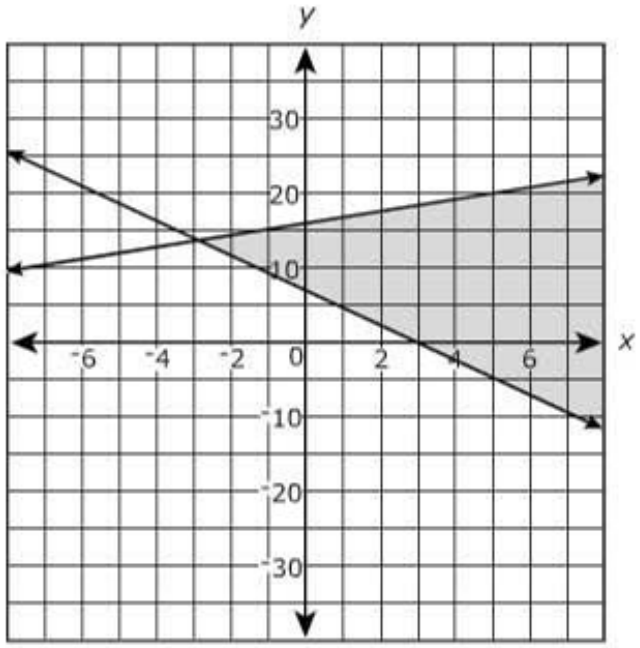
A every 15^{th} high school senior from each high school roster

B every high school senior who is taking AP Statistics

C every 15^{th} student on the roster attending the fall term at the college

D every senior attending the graduation ceremony

60. **Which system of inequalities is <u>best</u> represented by the shaded region below?**



A $\begin{cases} 7x + 3y > 21 \\ -4x + 5y < 80 \end{cases}$

B $\begin{cases} 7x + 3y \leq 21 \\ -4x + 5y \leq 80 \end{cases}$

C $\begin{cases} 7x + 3y \geq 21 \\ -4x + 5y \leq 80 \end{cases}$

D $\begin{cases} 7x + 3y \leq 21 \\ -4x + 5y \geq 80 \end{cases}$

61. **A research institute is studying the effects of exercise on memory power among healthy adults in their 60s. Which scenario describes an observational study?**

A Find 100 volunteers, 50 of whom exercise three days a week, and 50 of whom do not exercise. Give the volunteers memory tests at the beginning, middle, and end of the study; analyze the data; and draw conclusions.

B Find 100 volunteers who regularly exercise. Assign 50 of them to stop exercising for the duration of the study. Give the volunteers memory tests at the beginning, middle, and end of the study; analyze the data; and draw conclusions.

C Find 100 volunteers who do not exercise. Assign 50 of them to start exercising three days a week. Give the volunteers memory tests at the beginning, middle, and end of the study; analyze the data; and draw conclusions.

D Find 100 volunteers who do not exercise. Assign all of the volunteers to start exercising three days a week. Give the volunteers memory tests at the beginning, middle, and end of the study; analyze the data; and draw conclusions.

62. **A report shows that 40 percent of the population reads newspapers. Which expression represents the probability that in a group of 1,000 random people, exactly 400 people read newspapers?**

A $(0.40)^{600}(0.60)^{400}$

B $(0.40)^{400}(0.60)^{600}$

C $\binom{1,000}{400}(0.40)^{400}(0.60)^{600}$

D $\binom{1,000}{400}(0.40)^{600}(0.60)^{400}$

63. **What values of x make this equation true?**

$$-(2x + 6)^2 + 14 = 30$$

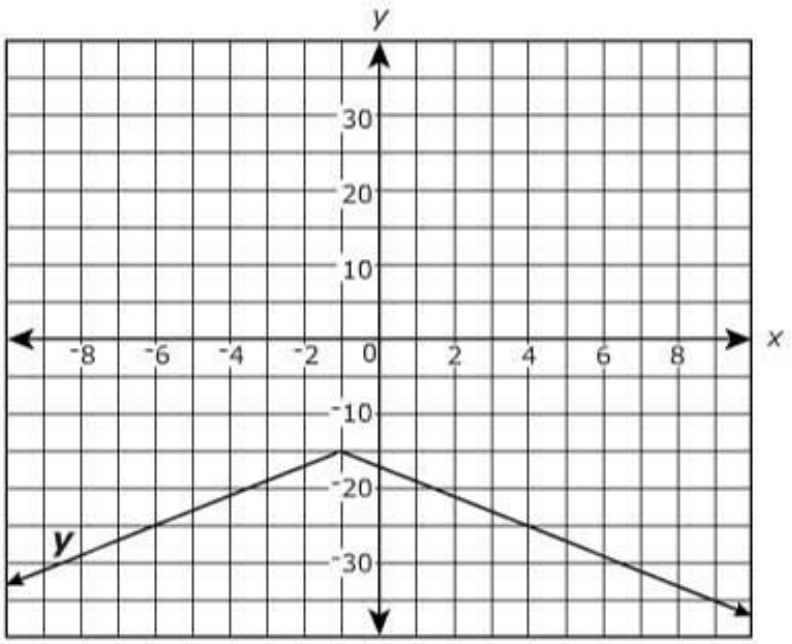
A $-1, -5$

B $1, 5$

C $-3 - 2i, -3 + 2i$

D $3 + 2i, 3 - 2i$

64. **The graph of the equation $y = -2|x + 1| - 15$ is translated 8 units up and 6 units to the right to form a new graph y'.**



Which equation <u>best</u> represents the graph of y'?

A $y' = -2|x - 5| - 15$

B $y' = -2|x - 5| - 7$

C $y' = -2|x + 1| - 23$

D $y' = -2|x + 1| - 7$

65. **Which quadrant of the complex plane would contain the point represented by the complex number $\sqrt{-\frac{9}{16}} + \frac{1}{2}$?**

A Quadrant I

B Quadrant II

C Quadrant III

D Quadrant IV

Answer Key

Item Number	Correct Answer
1	C
2	D
3	A
4	B
5	D
6	C
7	A
8	D
9	B
10	D
11	A
12	A
13	D
14	C
15	B
16	A
17	D
18	C
19	B
20	C
21	D
22	B

Item Number	Correct Answer
23	D
24	C
25	B
26	A
27	C
28	A
29	C
30	A
31	B
32	D
33	B
34	C
35	D
36	D
37	A
38	A
39	D
40	B
41	B
42	D
43	A
44	C

Item Number	Correct Answer
45	C
46	B
47	D
48	A
49	A
50	C
51	B
52	C
53	B
54	D
55	C
56	A
57	B
58	B
59	A
60	C
61	A
62	C
63	C
64	B
65	A

Reporting Categories

Below you will find that each item has been linked to its corresponding Reporting Category. These five Reporting Categories will be used to report scores from the actual test.

You can find the Reporting Categories and their Performance Indicators grouped together in the Tennessee End of Course Item Sampler for Algebra II located on the Tennessee Department of Education Web site at http://tennessee.gov/education/assessment/sec_samplers.shtml.

Item	Reporting Category
1	3 -Algebra
2	5 -Data Analysis, Statistics, and Probability
3	3 -Algebra
4	1 - Mathematical Processes
5	3 -Algebra
6	5 -Data Analysis, Statistics, and Probability
7	5 -Data Analysis, Statistics, and Probability
8	3 -Algebra
9	4- Geometry and Measurement
10	1 - Mathematical Processes
11	5 -Data Analysis, Statistics, and Probability
12	3 -Algebra
13	3 -Algebra
14	2- Number and Operations
15	5 -Data Analysis, Statistics, and Probability
16	1 - Mathematical Processes
17	3 -Algebra
18	5 -Data Analysis, Statistics, and Probability
19	3 -Algebra
20	3 -Algebra
21	5 -Data Analysis, Statistics, and Probability
22	1 - Mathematical Processes

Item	Reporting Category
23	2- Number and Operations
24	4- Geometry and Measurement
25	3 -Algebra
26	5 -Data Analysis, Statistics, and Probability
27	5 -Data Analysis, Statistics, and Probability
28	4- Geometry and Measurement
29	2- Number and Operations
30	3 -Algebra
31	3 -Algebra
32	3 -Algebra
33	5 -Data Analysis, Statistics, and Probability
34	3 -Algebra
35	3 -Algebra
36	1 - Mathematical Processes
37	3 -Algebra
38	3 -Algebra
39	5 -Data Analysis, Statistics, and Probability
40	3 -Algebra
41	3 -Algebra
42	4- Geometry and Measurement
43	5 -Data Analysis, Statistics, and Probability
44	3 -Algebra
45	3 -Algebra
46	2- Number and Operations
47	3 -Algebra
48	4- Geometry and Measurement
49	2- Number and Operations
50	1 - Mathematical Processes
51	3 -Algebra
52	3 -Algebra
53	3 -Algebra

Item	Reporting Category
54	5 -Data Analysis, Statistics, and Probability
55	3 -Algebra
56	3 -Algebra
57	5 -Data Analysis, Statistics, and Probability
58	4- Geometry and Measurement
59	1 - Mathematical Processes
60	3 -Algebra
61	5 -Data Analysis, Statistics, and Probability
62	3 -Algebra
63	2 - Number and Operations
64	3 -Algebra
65	2 - Number and Operations